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10/537,960	03/01/2006	Shoji Kawahito	052874	8485
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WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP			RATCLIFFE, LUKE D	
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The time period for reply, if any, is set in the attached communication.



## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1, 3, 4, 7, 9-12, and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seo (20010022653) in view of Deck (4864515).**

Referring to **claims 1 and 4**, Seo teaches a distance image sensor for projecting light from a light source to an object and measuring the time of flight including a photo diode (paragraph 45), a gate means (paragraph 45 and 63-70), a plurality of charge storage nodes (paragraph 45 and 63-70), a control means (paragraph 45 and 63-70), and a determination of distance via the distribution ratio of the stored charges (paragraph 45 and 63-70). However Seo shows the use of a single gate means to transfer the charge to the storage nodes.

Deck shows a similar system that uses multiple gates to transmit a charge to storage nodes (figure 2). It would have been obvious to modify Seo to include the multiple gates as taught by Deck because this is a simple substitution of a single gate system to a multiple gate system to obtain a predictable result which is a more efficient means of transfer of the charge to be stored.

Referring to **claim 3**, Seo shows a sampling and hold means corresponding to each of the charge storage nodes (paragraph 63-70).

Referring to **claims 7 and 12**, Seo teaches a distance image sensor for projecting light from a light source to an object and measuring the time of flight including a photo diode (paragraph 45), a gate means (paragraph 45 and 63-70), a plurality of charge storage nodes (paragraph 45 and 63-70), a control means (paragraph 45 and 63-70), and a determination of distance via the distribution ratio of the stored charges (paragraph 45 and 63-70). However Seo shows the use of a single gate means to transfer the charge to the storage nodes.

Deck shows a similar system that uses multiple gates to transmit a charge to storage nodes (figure 2). It would have been obvious to modify Seo to include the multiple gates as taught by Deck because this is a simple substitution of a single gate system to a multiple gate system to obtain a predictable result which is a more efficient means of transfer of the charge to be stored. However neither Seo nor Deck show the brightness of the image signal acquired from the sum of the charges in the two storage nodes and then storing that charge in a third storage node. However this would be obvious because it is well known to store in memory previous signals to compare them with current signals to determine the validity of the measurement that will be obtained. This process is well known and adds no new or unexpected results.

Referring to **claims 9 and 15**, it would be obvious to have the pulse width for receiving the projected light, that is the period when the gate is open, or the period when the switching means is closed, is sufficiently short with respect to the repeat cycle because this is necessary to receive the signal without error.

Referring to **claims 10 and 15**, Seo teaches the storage nodes are cleared after every distance has been calculated (figures 11A and 11B).

Referring to **claims 11 and 16**, Seo shows a control means that control the gate means or switching means so that the charges at the moment when the reflected light rises are stored in the first charge storage node or capacitor, and the charges after reflected light is at a stable level are stored in the second charge storage node (paragraph 63-70).

**Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seo (20010022653) in view of Deck (4864515) as applied to claims 1 and 4 above, and further in view of Kawabata (461432).**

Referring to claims 2 and 5, Seo teaches a distance image sensor for projecting light from a light source to an object and measuring the time of flight including a photo diode (paragraph 45), a gate means (paragraph 45 and 63-70), a plurality of charge storage nodes (paragraph 45 and 63-70), a control means (paragraph 45 and 63-70), and a determination of distance via the distribution ratio of the stored charges (paragraph 45 and 63-70). However Seo shows the use of a single gate means to transfer the charge to the storage nodes.

Deck shows a similar system that uses multiple gates to transmit a charge to storage nodes (figure 2). It would have been obvious to modify Seo to include the multiple gates as taught by Deck because this is a simple substitution of a single gate system to a multiple gate system to obtain a predictable result which is a more efficient means of transfer of the charge to be stored. However neither Seo nor Deck teach a third capacitor that when reflected light by projected light

does not exist, charges by background light that is sent to the storage node by a third gate means.

Kawabata teaches a storage node that is independently selected that will record background light (column 4 line 13-31). It would have been obvious to further modify Seo to include the third storage node as taught by Kawabata because this node allows the system to measure ambient light and then be able to subtract that ambient light from the received signal when there is a reflected return.

***Allowable Subject Matter***

Claims 6, 8, and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

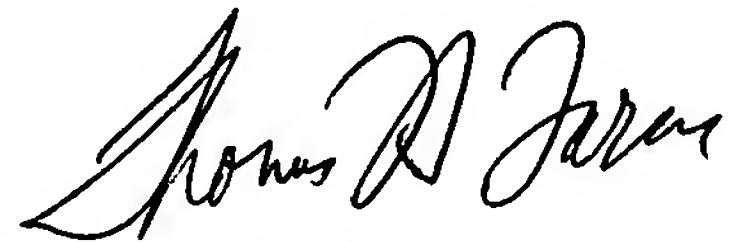
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luke D. Ratcliffe whose telephone number is 571-272-3110. The examiner can normally be reached on 10:00-5:00 M-Sun.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Tarcza can be reached on 571-272-6979. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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